

Assessing Self-regulated Learning (SRL) in Specific Contexts: An Overview and Illustration of SRL Microanalysis

National Academy of Sciences

Workshop on Assessment of 21st Century Skills

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Primary Objectives of Session

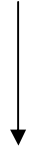
1. To briefly underscore the need for and importance of self-regulation assessment
2. To briefly describe a **three-phase cyclical model** of self-regulated learning (SRL)
3. To briefly distinguish two broad “**types**” of SRL assessment approaches
4. To highlight **SRL Microanalysis**
 - ∅ historical factors
 - ∅ implementation procedures
 - ∅ reliability and validity

Multidimensional Assessment Approach



Multiple Sources

1. Parents
2. Teachers
3. Child
4. Psychologists
5. Principals



Multiple Methods

1. Standardized tests
2. Observations
3. Interviewing
4. Self-reports
5. Rating Scales
6. Review Records
7. Think alouds
8. SRL microanalysis



Multiple Areas

1. Intellectual
2. Memory
3. Language
4. Academic
5. Social
6. Emotional
7. Motivation
8. Self-regulation

Survey research has illustrated a disconnect **between** the **value and importance** of self-regulation assessments and interventions and the extent to which one **engages in such practices** ^{1, 2, 3}

Self-regulation assessments are valued and needed ^{1, 2}

- q **Self-regulation/motivation referrals** occur at a rate similar to many other “common” referral problems
 - √ 30% to 40% of school psychologists indicated that student self-regulation and motivation issues are a **top-four** referral issue
- q Teachers and school psychologists rate **professional development training** in motivation/self-regulation assessments to be a key area of interest
 - √ Out of 10 possible assessment domains, self-regulation was ranked by school psychologists to be the **2nd** (suburban) and **3rd** (urban) **most important areas** of professional development
- q Link between SRL and achievement ^{4,5}

Self-regulation assessments rarely occur in practice

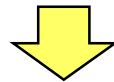
- q School psychologists **do not consistently administer self-regulation assessments** and are largely unfamiliar with the different types of tools ^{1,2}
 - ∨ rarely conduct self-regulation assessments ($M = 2.6$) (likert 1-5)
 - ∨ lack of knowledge of traditional measures of self-regulation (**self-reports**) and alternative methods (**think alouds**)
 - ∨ rely on self-report that are not directly targeting self-regulation
 - ∨ may not receive adequate training in graduate school

- q Teachers **rarely receive information** about student self-regulation and motivation processes ³
 - ∨ teachers reported being significantly **more familiar with traditional assessment data** (IQ, academic scores) than self-regulation and motivation assessment data, but viewed the **self-regulation data as being more useful** for improving their teaching roles

Characteristics of a self-regulated learner? ^{4,6,7,8}

- ∅ Set goals and develop/use strategic plans
- ∅ Highly self-motivated, proactive
- ∅ Engage in forms of self-control
- ∅ Monitor strategies, performance, cognition
- ∅ Frequent self-reflection and analysis

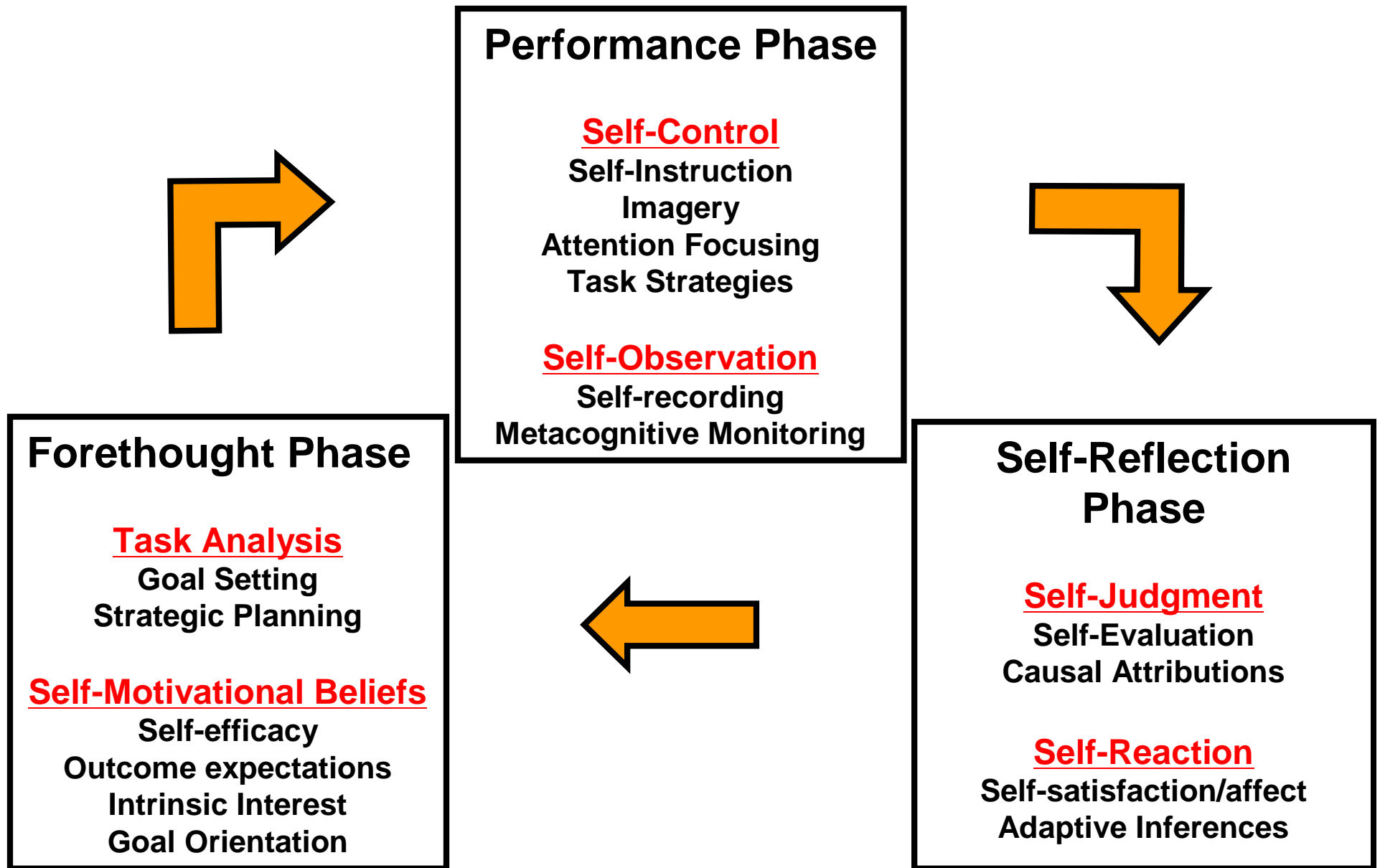
ADJUST or **CHANGE** strategies and goals



To optimize future performance

What does self-regulation look like as a “process”?

Cycle of Self-Regulatory Thought and Action ⁴



What are the different ways researchers or practitioners can evaluate SRL? ^{9, 10}

Aptitude measures

- 1) assessment tools that target SRL as a relatively **global** and **enduring attribute** of a person that predicts future behavior
- 2) are more aligned with listing of **characteristics** of SRL
- 3) typically include **self-report scales** – most common method of SRL assessment
- 4) **retrospective accounts** of **de-contextualized** student behaviors and thoughts in terms of frequency, typicality, and usefulness

Event measures

- 1) assessment tools that target SRL as a **changeable event** --- behaviors and cognition that may vary across contexts/tasks
- 2) are well-equipped to capture the **process** of SRL
- 3) include direct observations, think aloud, behavioral traces, **SRL microanalysis**
- 4) **direct assessment** of regulatory processes as they occur in **real-time** in **authentic contexts**

A. Examples of “Aptitude” scales

- a) Motivated Strategies for Learning Questionnaire (MSLQ) ¹¹
- b) Learning & Study Strategies Inventory (LASSI) ¹²
- c) School Motivation & Learning Strategy Inventory (SMALSI) ¹³
- d) Self-Regulation Strategy Inventory (SRSI-SR) ¹⁴

Potential problems ^{15, 16}

a) De-contextualized and global

- research has shown that students’ self-reports of SRL behaviors vary across different content areas as well as across tasks within a course

b) Calibration or accuracy

- student self-reports are often not consistent with their SRL behaviors

B. Examples of “Event” SRL measures ¹⁰

- 1) **Direct observations** – records of students’ actual behaviors in an authentic environment or setting (w/o external intervention)
- 2) **Traces** – overt indicators of student cognition created during task engagement (e.g., underlining, highlighting)
- 3) **Personal Diaries** – records of study behaviors at home or the types of thoughts/actions when performance specific tasks
- 4) **Verbal Report** or **Think aloud protocols** – records of students thought as they complete authentic activities

SRL Microanalysis – structured interview approach that targets primarily students’ beliefs, attitudes and cognitive regulatory processes before, during, and after some specific task

SRL Microanalysis

A. Historical background ¹⁷

∅ **Increased emphasis on cognition and beliefs in 1970's**

q **Social-cognitive theory**

- Bandura's initial conceptualization of cyclical regulation
- self-efficacy, outcome expectations

q **Cognitive-behavioral therapy**

- self-instructional therapy, stress inoculation, cognitive restructuring

q **Think aloud protocols**

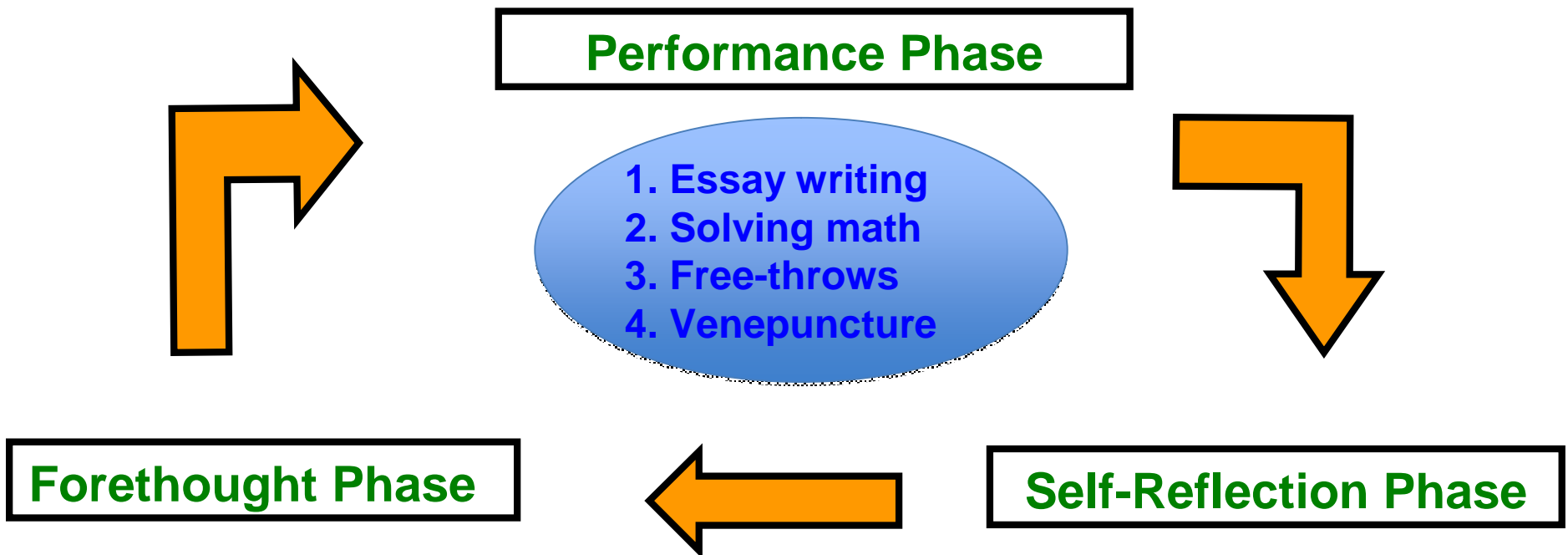
- target cognition for specific contexts and events

Ø Increased emphasis on context-specificity

- q Self-regulation varies across contexts and tasks**
- q Increased reliance and importance on ecologically-sensitive or context-specific assessment methods**
 - functional behavioral assessment**
 - direct observations**
 - curriculum-based measurement**

B. Description overview¹⁷

- ∅ Targets **cognition** (motivation beliefs, regulatory process)
- ∅ Explicitly targets SRL processes embedded in the **3-phase cyclical loop** – interested in “process”



- ∅ Uses a **structured interview format** to strategically examine these processes during a task

C. General steps of SRL microanalysis ¹⁷

- a) Select a specific **task** with a clear beginning, middle, end
 - drawing blood
 - studying for an exam
 - shooting free-throws
 - writing an essay
- b) Identify the cyclical phase **self-regulation processes**
- c) Develop context-specific **assessment questions** to target the identified SRL processes
- d) Link **3-phase cycle processes** to temporal dimensions of the **task**

- ✓ **Forethought phase** ----- Before Task
- ✓ **Performance phase** ----- During Task
- ✓ **Self-reflection phase** ----- After Task

Cleary and Zimmerman (2001) ¹⁸



Purpose

Ex-post facto study to examine self-regulation differences among expert, non-expert, and novice basketball players using SRL microanalysis

Sample

Experts – varsity basketball players who shot over 70% from the free-throw line during a basketball season

Non-experts – varsity basketball players who shot less than 55% from the free-throw line during a basketball season

Novices – never played organized basketball beyond the 7th grade

SRL Microanalytic Procedures

a) Select a specific task

- all students were asked to practice their free-throws for approximately 10 minutes

b) Identify self-regulation processes in cyclical loop

Forethought

- self-efficacy, goal-setting, strategy planning

Self-Reflection

- attributions, adaptive inferences, satisfaction

c) Task-specific questions to assess SRL processes

- identified from prior research, expert consensus, and/or theoretical definitions

d) Administering Microanalytic Questions

Before engaging in the free-throw shooting task

a) Self-efficacy

“On a scale from 0 to 100 with 10 being not sure, 40 being somewhat sure, 70 being pretty sure, and 100 being very sure, how sure are you that you will make two shots in a row”

b) Goal-setting

“Do you have any goal when practicing these free-throws? If so what is it?”

Response categories

(a) outcome-general, (b) outcome-specific, (c) process-general, (d) process-specific, (e) focus-general, (f) focus-specific, (g) rhythm, (h) none, (i) other

c) Strategy Choice

“What do you need to do to accomplish that goal?”

Response categories

(a) general technique, (b) specific-technique, (c) visualization, (d) distractions, (e) focus-general, (f) focus-specific, (g) rhythm, (h) don't know, (i) other

Self-reflection questions were administered under two conditions: (a) following two missed free-throws in a row and (b) following two makes in a row

a) Self-efficacy

“On a scale from 0 to 100 with 10 being not sure, 40 being somewhat sure, 70 being pretty sure, and 100 being very sure, how sure are you that you will make **THE NEXT SHOT**”

b) Attributions following missed free-throws

“What is the main reason why you missed those last two shots?”

Response categories

(a) general technique, (b) specific-technique, (d) distractions, (e) focus-general, (f) focus-specific, (g) rhythm, (h) confidence (i) effort, (j) don't know, (k) other

c) Adaptive inferences following missed free-throws

“What do you need to do to make the next shot?”

Response categories

(a) general technique, (b) specific-technique, (c) visualization, (d) distractions, (e) focus-general, (f) focus-specific, (g) rhythm, (h) don't know, (i) other

SRL microanalysis – reliability and validity ¹⁷

Reliability

a) Metric variables (self-efficacy, interest)

- alpha coefficients in the **.80's and .90's**

b) Categorical variables

- kappa coefficients have ranged from **.81 to .98** across planning, goal-setting, self-monitoring, self-evaluation, attributions, and adaptive inferences
- Using of scoring rubrics and manuals

Validity

a) Content validity

- all questions were derived from theoretical models, operational definitions, and expert consensus

b) Predictive validity

- 1) A composite of microanalytic questions predicted **90% of the variance** in volleyball serving skill ¹⁹**
- 2) Attribution and adaptive inference questions accounted for approximately **30% of the variance** in course grades, over and above that accounted for by self-report scales ²⁰**

c) Differential validity

Several studies have differentiated expert and novice achievement groups across volleyball serving and basketball free-throwing ^{18, 19, 20}

Cleary & Zimmerman (2001)

Strategic Planning	Experts	Non-experts	Novices
Specific technique	6	1	1
General technique	1	2	1
Visualization	1	0	1
Specific focus	1	1	1
General focus	4	3	4
Distractions	0	0	2
Rhythm	1	2	2
Don't know	1	3	3
Other	0	1	1

Attribution following miss	Experts	Non-experts	Novices
Specific technique	8	2	2
General technique	0	0	0
Confidence	0	0	0
Specific focus	0	1	0
General focus	2	2	0
Effort	2	0	0
Practice	0	0	3
Rhythm	1	4	2
Distractions	1	1	4
Don't know	1	1	1
Other	0	2	3

Adaptive Inference	Experts	Non-experts	Novices
Specific technique	9	3	1
General technique	1	3	1
Visualization	0	0	1
Specific focus	1	0	1
General focus	3	4	4
Distractions	0	1	2
Rhythm	1	2	2
Don't know	0	0	3
Other	1	0	1

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